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*Student and teacher: Use this cover sheet for mailing or faxing.***ASSIGNMENT BOOKLET 3A**MAT3038 Applied Mathematics 30
Module 3: Activities 1 to 3 Assignment**FOR STUDENT USE ONLY**

Date Assignment Submitted:

Time Spent on Assignment:

(If label is missing or incorrect)

Student File Number:

Module Number:

FOR OFFICE USE ONLY

Assigned

Teacher:

Assignment

Grading:

Graded by:

Date Assignment Received:

**Student's Questions
and Comments****Apply Module Label Here****Name****Address****Postal Code***Please verify that preprinted label is for
correct course and module.***Teacher's Comments**

Teacher

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- Has your work been reread to ensure accuracy in spelling and details?
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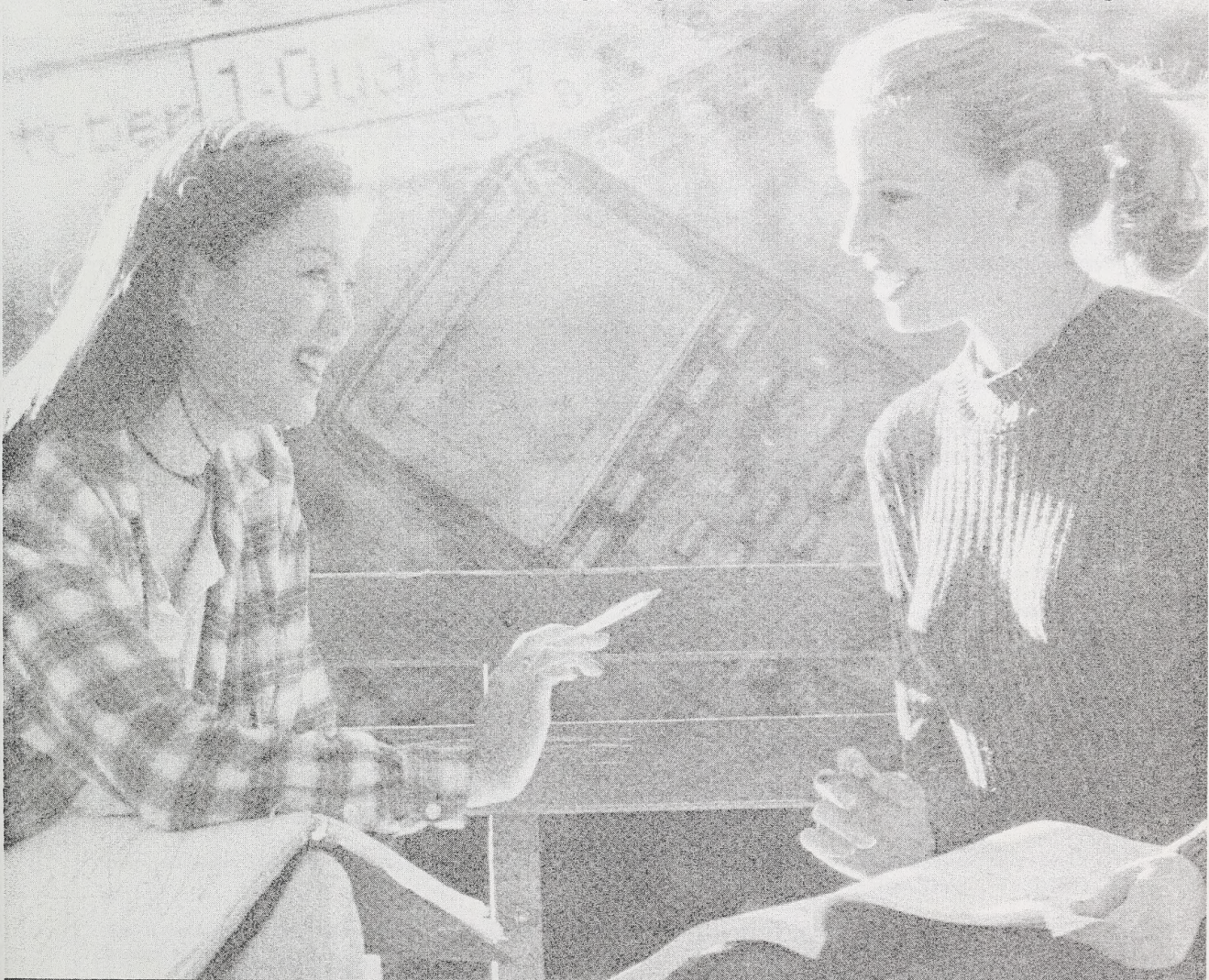
Applied

Mathematics 30

Module
3

STATISTICS

ASSIGNMENT BOOKLET 3A



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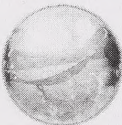
Summary

	Total Possible Marks	Your Mark
Activities 1 to 3 Assignment	75	

Teacher's Comments

Applied Mathematics 30
Module 3: Statistics
Assignment Booklet 3A
Activities 1 to 3 Assignment
Learning Technologies Branch
ISBN 0-7741-2198-X

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ASSIGNMENT BOOKLET 3A

APPLIED MATHEMATICS 30: MODULE 3

ACTIVITIES 1 TO 3 ASSIGNMENT

Your mark for this module will be determined in part by how well you do your assignments.

This Assignment Booklet is worth 75 marks out of the total 230 marks for the assignments in Module 3. The value of each assignment and each question is stated in the left margin.

Work slowly and carefully. If you have difficulty, go back and review the appropriate topic.

Be sure to proofread your answers carefully.

75

Activities 1 to 3 Assignment

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

- ② 1. a. Use your results from exercise 6 of “Investigation: Constructing Probability Distributions” on page 99 of the textbook to calculate the experimental probability for each outcome. Record your results in the table given as fractions. (**Do not reduce the fractions.**)

Outcome	Experimental Probability

- ① b. How do the experimental probabilities compare to the theoretical probabilities you calculated in exercise 2 on page 98 of the textbook?

Return to page 15 of the Student Module Booklet and continue with Activity 1.

③

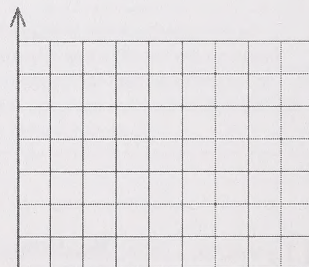
2. Use your graphing calculator to answer exercise 6.c. of “Exercises: Checking Your Skills” on page 104 of the textbook. Fill in the calculator displays given, and explain how you used your calculator to obtain the histogram.

L1	L2	L3	1

④

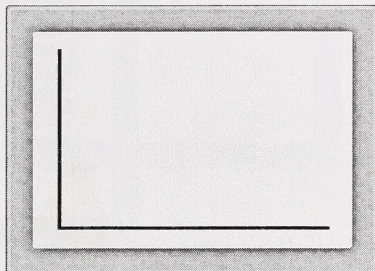
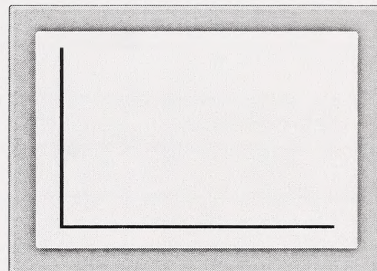
3. Answer exercise 7 of “Exercises: Checking Your Skills” on page 104 of the textbook.
Hint: Use the Binomial Probability Distribution feature of your graphing calculator to determine the probability of each outcome.

Outcome	Probability



Return to page 20 of the Student Module Booklet and continue with Activity 1.

5. 4. Answer exercise 5 of “Investigation 1: Compare Sets of Data” on page 106 of the textbook. Sketch the histograms in the blank displays given, and label each histogram. Write the information that appears when you calculate the mean and standard deviation in the display below the corresponding histogram.

Data Set 3**Data Set 4**

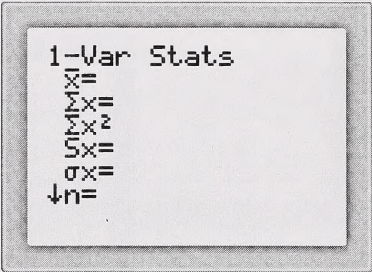
```
1-Var Stats
 $\bar{x}$ =
 $\Sigma x$ =
 $\Sigma x^2$ =
 $Sx$ =
 $\sigma x$ =
 $\downarrow n$ =
```

```
1-Var Stats
 $\bar{x}$ =
 $\Sigma x$ =
 $\Sigma x^2$ =
 $Sx$ =
 $\sigma x$ =
 $\downarrow n$ =
```

Return to page 25 of the Student Module Booklet and continue with Activity 2.

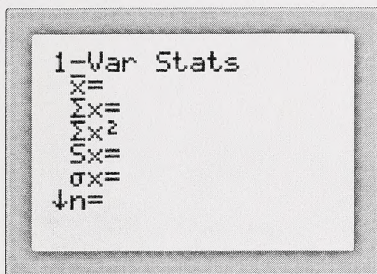
⑤

5. Answer exercise 6 of “Investigation 2: Mean and Standard Deviation of a Binomial Distribution” on page 107 of the textbook. Use your graphing calculator to see if the rules work. Fill in the display given to show what you used to check the rules.

Check

1-Var Stats
 \bar{x} =
 Σx =
 Σx^2 =
 Sx =
 σx =
 $\downarrow n$ =

- ③ 6. Answer exercise 6.a. of “Exercises: Checking Your Skills” on page 109 of the textbook. Explain how you used your calculator, and fill in the display given.



1-Var Stats
 \bar{x} =
 Σx =
 Σx^2 =
 Sx =
 σx =
 n =

- ⑤ 7. Answer exercise 9.a. of “Exercises: Checking Your Skills” on page 110 of the textbook. In place of 2.8%, use 3.75% as the percentage of defective switches. Round your answers to 2 decimal places.

8. Answer exercise 2.b. of “Exercises: Checking Your Skills” on page 117 of the textbook. Show how you obtained each answer.

①

Textbook exercise 2.b.i.:

①

Textbook exercise 2.b.ii.:

①

Textbook exercise 2.b.iii.:

①

Textbook exercise 2.b.iv.:

①

Textbook exercise 2.b.v.:

①

Textbook exercise 2.b.vi.:

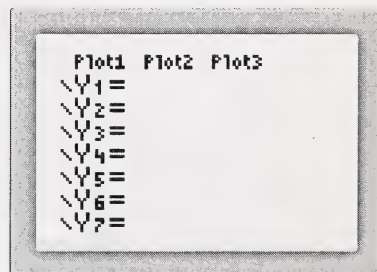
②

9. If the mean diameter of a shipment of fence posts increased from 15 cm to 25 cm and the standard deviation remained the same, how would the range of the diameters be affected?

- ⑤ 10. Answer exercise 9 of “Exercises: Checking Your Skills” on page 118 of the textbook. Provide a sketch of the normal curve for this exercise as part of your solution.

Return to page 33 of the Student Module Booklet and continue with Activity 3.

- ⑤ 11. Answer exercise 3.b. of “Getting Started” on page 48 of the Project Book. Include sketches of your calculator screen to support your answer. **Remember:** Excess material can be sold for \$3.00/m.



⑦

- 12.** Answer exercise 4 of “Getting Started” on pages 48 and 49 of the Project Book. Assume you are estimating the cost for a large number of jeans so that waste material is not considered in the calculations.

③

- 13.** Turn to page 50 of the Project Book and read the two paragraphs about the designer near the bottom of the page. If you use the five-hexagon template shown, how many different patch labels can be created if all 5 hexagonal stamps must be used? Recall from exercise 2 on page 48 of the Project Book that a rotation of each hexagon results in a new patch.

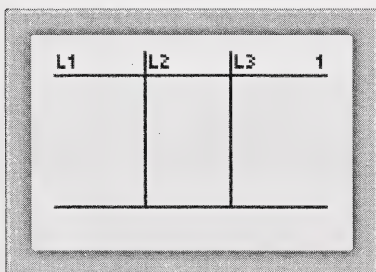
④

14. Design a template for square stamps that will give you more than 250 000 different patch labels.

④

15. The Beavers and the Bruins are rival hockey teams. During the last several seasons, the Beavers have won 70% of the games between the two teams.

- a. Use your graphing calculator to graph the Beavers' probability distributions for the next 5 games between the two teams. Fill in the following calculator displays, and label the graph.



4

- b. Use the probability distribution to determine the probability that the Beavers will win at least 3 of the next 5 games. As part of your solution, outline the procedure you used to find your answer. Round your answer to 4 decimal places.

16. Jane is practising for an archery competition. After each shot, her brother removes the arrow from the target and measures the distance the arrow was from the centre of the target. The following table summarizes the results of Jane's last 50 shots.

Distance (cm)	Frequency
1	5
2	8
3	14
4	10
5	9
6	4

②

- a. Use your graphing calculator to determine the mean and standard deviation of this data set. Round your answer to 2 decimal places. Copy the screen from which you obtained these values.

L1	L2	L3	1

1-Var Stats
$\bar{x} =$
$\Sigma x =$
$\Sigma x^2 =$
$Sx =$
$\sigma x =$
$n =$

②

- b. The data for the next 50 shots show a smaller mean and a smaller standard deviation. Explain whether Jane's performance improved or not.

③

17. On a classroom math test, the mean was 50 and the standard deviation was 10. The teacher decided to add 5 marks to each student's score. What are the mean and standard deviation of the test now that the marks have been increased? Explain.

Submit your completed Assignment Booklet 3A to your teacher for assessment.
Then return to page 34 of the Student Module Booklet and begin Activity 4.

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ASSIGNMENT BOOKLET 3B

MAT3038 Applied Mathematics 30

Module 3: Activities 4 to 6 Assignment, Module Review Assignment, and Module Project

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Date Assignment Submitted:

Time Spent on Assignment:

(If label is missing or incorrect)

Student File Number:

Module Number: _____

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Assigned

Teacher: _____

Assignment

Grading: _____

Graded by: _____

Date Assignment Received:

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Name

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Teacher's Comments

Teacher

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Applied

Mathematics 30

Module

3

STATISTICS

ASSIGNMENT BOOKLET 3B



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LEARNING

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Summary

	Total Possible Marks	Your Mark
Activities 4 to 6 Assignment	75	
Module Review Assignment	40	
Module Project	40	
	155	

Teacher's Comments

Applied Mathematics 30

Module 3: Statistics

Assignment Booklet 3B

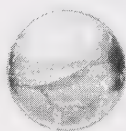
Activities 4 to 6 Assignment, Module Review Assignment, and Module Project

Learning Technologies Branch

ISBN 0-7741-2199-8

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Students	✓
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Administrators	
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Other	



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- Alberta Learning, <http://www.learning.gov.ab.ca>
- Learning Technologies Branch, <http://www.learning.gov.ab.ca/lb>
- Learning Resources Centre, <http://www.lrc.learning.gov.ab.ca>

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ASSIGNMENT BOOKLET 3B
APPLIED MATHEMATICS 30: MODULE 3
ACTIVITIES 4 TO 6 ASSIGNMENT, MODULE REVIEW
ASSIGNMENT, AND MODULE PROJECT

Your mark for this module will be determined in part by how well you do your assignments.

This Assignment Booklet is worth 155 marks out of the total 230 marks for the assignments in Module 3. The value of each assignment and each question is stated in the left margin.

Work slowly and carefully. If you have difficulty, go back and review the appropriate topic.

Be sure to proofread your answers carefully.

75

Activities 4 to 6 Assignment

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

2

1. What z-score would correspond to a score of 120 in exercise 3 of “Exercises: Checking Your Skills” on page 124 of the textbook?

2. Answer exercises 4, 6.b., and 8 of “Exercises: Checking Your Skills” on pages 124 and 125 of the textbook.

4

Textbook exercise 4:

4

Textbook exercise 6.b.:

④

Textbook exercise 8:

②

3. What z-score would correspond to a mass of 212 g in exercise 5 of “Exercises: Checking Your Skills” on page 124 of the textbook?

③

4. What is the probability that a random student would achieve a score greater than 275 in exercise 7 of “Exercises: Checking Your Skills” on page 125 of the textbook? Sketch the probability distribution that appears on your graphing calculator.



③

5. What percentage of eggs would have a height less than 5.48 cm in exercise 9 of “Exercises: Checking Your Skills” on page 125 of the textbook? Sketch the probability distribution that appears on your graphing calculator.



Return to page 44 of the Student Module Booklet and continue with Activity 4.

②

6. Explain how to find the z -score in exercise 5 on page 47 of the Student Module Booklet using a graphing calculator. Show the key sequence you would use and what appears on your display.



3

7. How do the results of the following keystrokes relate to the answer to exercise 7 on page 47 of the Student Module Booklet? Explain what the calculator is doing.

2nd [DISTR] 3 [•] 0 5 [,] 1 8 [,] 3 [)] ENTER

Return to page 47 of the Student Module Booklet and continue with Activity 4.

8. Complete exercises 4 and 5 of “Investigation: Calculating Probabilities” on pages 127 and 128 of the textbook. Round the differences between probabilities to 5 decimal places.

3

Textbook exercise 4:

Exercise	Value of $n \times p \times (1 - p)$	Difference Between Actual and Estimated Probability
1		
2		
3		

1

Textbook exercise 5.a.:

1

Textbook exercise 5.b.:

①

Textbook exercise 5.c.: _____

9. The following questions relate to your work in “Investigation: Calculating Probabilities” on pages 126 to 128 of the textbook.

①

- a. In which exercise was the value of $n \times p$ the smallest? the largest?

①

- b. In which exercise was the value of $n \times (1 - p)$ the smallest? the largest?

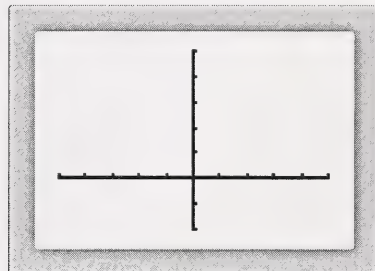
①

- c. What inference can you draw about the relationship between the values $n \times p$ and $n \times (1 - p)$ and the difference between the actual probability and the estimated probability?

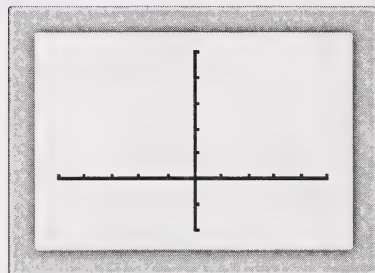
Return to page 53 of the Student Module Booklet and continue with Activity 5.

10. Answer exercises 3 and 7 of “Exercises: Checking Your Skills” on pages 130 and 131 of the textbook. For each exercise, sketch the area that appears on your graphing calculator. Make sure to include the values provided.

⑤

Textbook exercise 3:

⑤

Textbook exercise 7:

11. Answer exercises 1.d., 3, 6, and 9 of “Exercises: Checking Your Skills” on pages 139 to 141 of the textbook. Round your answers to 3 decimal places.

5

Textbook exercise 1.d.:

④

Textbook exercise 3.a.:

③

Textbook exercise 3.b.:

④

Textbook exercise 6.a.:

③

Textbook exercise 6.b.:

③

Textbook exercise 6.c.:

④

Textbook exercise 9.a.:

③

Textbook exercise 9.b.: _____

40

Module Review Assignment

Read all parts of your assignment carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.

Answer questions 1 to 6 on the answer sheet provided on page 18 of this Assignment Booklet. The answer sheet is similar to the one that will be used on the Diploma Examination for Applied Mathematics 30. Read the following information before proceeding.

Multiple Choice

- Decide which of the choices **best** completes the statement or answers the question.
- Locate that question number on the separate answer sheet provided, and fill in the circle that corresponds to your choice.

Example

This assignment is for the subject of

- A. biology
- B. physics
- C. chemistry
- D. mathematics

Answer Sheet

(A) (B) (C) ●

Numerical Response

- Record your answer on the answer sheet provided by writing it in the boxes and then filling in the corresponding circles.
- If an answer is a value between 0 and 1 (e.g., 0.7), then be sure to record the 0 before the decimal place.
- **Enter the first digit of your answer in the left-hand box. Any boxes on the right that are not needed are to remain blank.**

Examples

Calculation Questions and Solutions

The value of $\tan 35^\circ$, to the nearest tenth, is _____.

(Record your answer in the numerical-response section on the answer sheet.)

Calculator value: 0.700 207 5

Value to be recorded: 0.7

Record 0.7 on the answer sheet. →

0	.	7	
---	---	---	--

●

•

0

0

0

0

1

1

1

1

2

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2

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3

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3

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4

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8

9

9

9

9

A particular matrix operation produces the equation

$$2 \begin{bmatrix} 1 & 0.5 \\ 1.5 & 4 \end{bmatrix} = \begin{bmatrix} a & b \\ c & 8 \end{bmatrix}$$

In the equation above, the value of

a is _____ (Record in the **first** column.)

b is _____ (Record in the **second** column.)

c is _____ (Record in the **third** column.)

(Record all **three digits** of your answer in the numerical-response section on the answer sheet.)

Value to be recorded: 213

Record 213 on the answer sheet. →

2	1	3	
---	---	---	--

•

•

0

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0

0

1

●

1

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9

9

Correct-Order Question and Solution

Four different sets of data produce the following standard deviations.

1	0.3	2	2.4
3	1.6	4	1.9

When these four standard deviations are arranged in order from **lowest** to **highest**, the order is _____, _____, _____, and _____.

(Record all **four digits** of your answer in the numerical-response section on the answer sheet.)

Value to be recorded: 1342

Record 1342 on the answer sheet. →

1	3	4	2
○	○	○	○
○	○	○	○
●	○	○	○
○	○	○	●
○	○	○	○
○	○	○	○
○	○	○	○
○	○	○	○
○	○	○	○
○	○	○	○
○	○	○	○
○	○	○	○
○	○	○	○
○	○	○	○

②

1. A billiard manufacturer randomly selects a box of 12 cues and weighs each cue in it. In ounces, the cues weigh 17.9, 16.7, 17.3, 17.8, 17.2, 16.9, 16.5, 16.8, 17.1, 16.3, 16.4, and 16.1. What is the mean and standard deviation of these weights?

- A. $\mu = 16.9$ ounces and $\sigma = 0.2$ ounces
 B. $\mu = 16.9$ ounces and $\sigma = 0.5$ ounces
 C. $\mu = 17.1$ ounces and $\sigma = 0.2$ ounces
 D. $\mu = 17.1$ ounces and $\sigma = 0.5$ ounces

②

2. A different billiard manufacturer claims that the cues they produce have a mean mass of 17.1 ounces with a standard deviation of 0.4 ounces. If a person was to randomly select a cue, what is the probability that its weight is exactly 17.2 ounces **or** less?

- A. 0.37
 B. 0.40
 C. 0.60
 D. 0.63

Use the following information to answer question 3.

Lori played 24 rounds of golf on the same course during each of two seasons. In the first season, her mean score was 78 with a standard deviation of 4.1. In the second season, her mean score was 74 with a standard deviation of 3.8.

2

3. The **standard deviation** of Lori's scores for the two seasons indicates that her
- A. scores were more consistent in the first season
 - B. scores were more consistent in the second season
 - C. average score was better in the first season
 - D. average score was better in the second season

Use the following information to answer question 4.

In a particular city with 40 000 high school students, 31 500 were found to be in favour of starting school earlier in the day in order to finish earlier. Josh surveys 100 randomly selected students from this population to determine if they are in favour of this proposal.

2

4. The symmetric 95% confidence interval for the number of students that Josh finds to be in favour of the proposal is
- A. 75 to 83
 - B. 68 to 90
 - C. 72 to 86
 - D. 71 to 87

Numerical Response

Malaga, Spain, lies in a region of Europe known as the Costa del Sol (Coast of the Sun). The probability of sunshine on any given day in this region is approximately 0.89.

2

1. In a non-leap year of 365 days, the average number of days of the year that a tourist could expect to experience weather other than sunshine, to the nearest whole number, is _____.

(Record your answer in the numerical-response section on the answer sheet.)

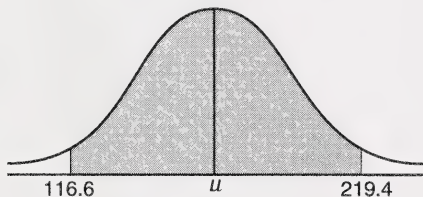
- ② 5. In a standard normal distribution, the probability that a particular z -score falls within 0.7 standard deviations of the mean ($-0.7 < z < 0.7$) is
- A. 0.242
B. 0.300
C. 0.516
D. 0.758

Use the following information to answer question 6.

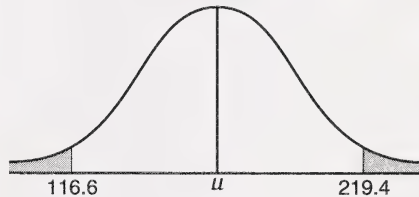
During a quality-control test, 20 batteries are picked at random from an assembly line. The symmetric 95% confidence interval for the average life span of each battery is 116.6 h to 219.4 h.

- ② 6. Which of the following graphs has a shaded region indicating this symmetric 95% confidence interval?

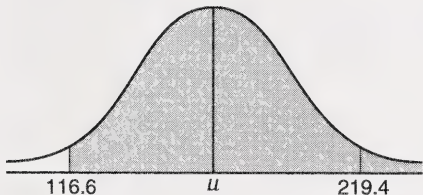
A.



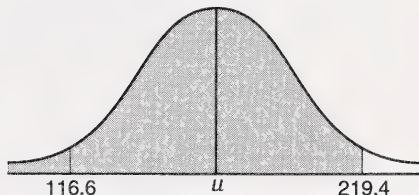
B.



C.



D.



Numerical Response

- ② 2. At a concert, a random sample of ticket buyers revealed that the amount of time they had waited in line to purchase their tickets was normally distributed with a mean of 185 minutes and a standard deviation of 15 minutes. The percentage of people that stood in line for 180 min or less is _____.

(Record your answer in the numerical-response section on the answer sheet.)

Answer Sheet

1. (A) (B) (C) (D)

2. (A) (B) (C) (D)

3. (A) (B) (C) (D)

4. (A) (B) (C) (D)

5. (A) (B) (C) (D)

6. (A) (B) (C) (D)

Numerical Response

1.

--	--	--	--

	•	•	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

2.

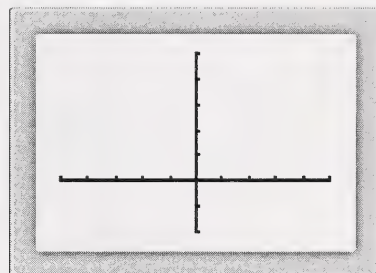
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	•	•	
0	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

7. Wheat plants in an agricultural test plot have heights that are normally distributed with a mean of 20 cm and a standard deviation of 2 cm.

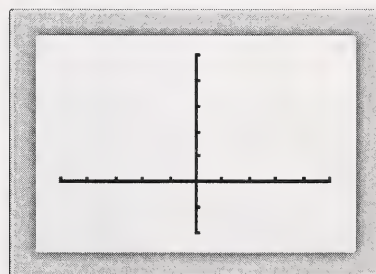
⑤

- a. What is the proportion of plants that have heights between 19 cm and 20.5 cm? Use the Shade Normal feature on your graphing calculator, and sketch what your calculator shows on the blank screen given. Round your answer to 4 decimal places.



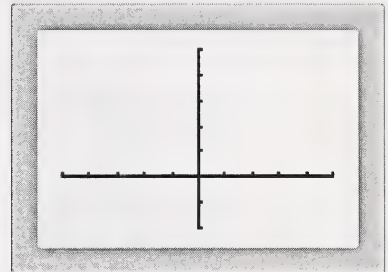
⑤

- b. What proportion of the plants are taller than 17.5 cm? Again, sketch what appears on your calculator display on the blank screen given, and round your answer to 4 decimal places.



- ⑤ 8. The mean on a district-wide mathematics test was 60%. Assuming the marks are normally distributed and that 15% of the students had marks of 80 or better, what was the standard deviation for this test? Round your answer to the nearest tenth.

5. 9. The masses of a particular brand of crackers are normally distributed with a mean of 3.00 g and a standard deviation of 0.125 g. In a box of 250 crackers, estimate the number of crackers with masses less than 2.80 g.



4. 10. Without performing the calculations, state how the confidence interval and margin of error would change if they were determined for a 90% confidence level rather than a 95% confidence level. Justify your answer.

Return to page 62 of the Student Module Booklet and continue with the Module Review.
If your teacher has indicated that the Module 3 project does not need to be completed,
submit Assignment Booklet 3B to your teacher for assessment.

40

Module Project: Opinion Polls

Your teacher may not require you to complete all the projects in this Applied Mathematics 30 course. Contact your teacher and check whether you need to complete the module project, Opinion Polls, as part of your assessment.

If you are required to complete this project, **read all parts of the project carefully and record your answers in the appropriate places. Clearly show how you arrived at your answers by showing your work.**

Your project for Module 3 is Opinion Polls. A major aspect of this project involves designing and conducting a survey. You will gather and analyse the data from this survey. You will then report the results and indicate the confidence you have that these results are a fair indication of the population the surveyed sample represents.

The question in your survey is your decision; however, the respondents surveyed must answer “yes” or “no” to the question asked. An example of such a question is as follows:

The school administration is proposing to change the start of the school day from 8:00 A.M. to 9:00 A.M. Are you in favour of this proposal? Answer “yes” or “no.”

Your work in this project will be a final version of the work you did on the project throughout the Student Module Booklet.

1. Select one of the articles you collected from newspapers, magazines, and the Internet that report the results of a survey or opinion poll. Use this article to answer the following questions. The article you select must include the sample size, the results of the survey as a percentage, the level of confidence in the results, and the margin of error. Attach the article or a copy of the article to this Assignment Booklet.

2

- a. Describe the purpose of the survey. Include the question(s) asked.

2

- b. How was the sample selected and what population does the sample represent?

①

c. What was the sample size?

③

d. What were the results of the survey? Include the confidence interval and the margin of error.

- ④
- e. Apply the formulas you studied in Module 3 to confirm the confidence interval and the margin of error reported in the article. Include all your calculations. Are these the same values that were reported?

②

2. What was the purpose of your survey? What did you want to find out?

②

3. What question(s) did you ask the surveyed respondents? Give the exact wording.

③

4. How did you select your sample? What population did you intend this sample to represent?

①

5. What was the sample size?

④

6. Summarize the responses of the people you surveyed. If you include a table, use headings for rows and/or columns to ensure your table can be easily understood.

- ④ 7. Calculate the mean and standard deviation for the data you collected. Show all relevant calculations or draw the calculator display showing the calculations.
- ④ 8. Is it appropriate to use the normal distribution to estimate probabilities from your survey? Include all necessary calculations to justify your answer.

④

9. Calculate the 95% confidence interval and the margin of error for your results.

④

10. Write a complete report that accurately states your results. Include the margin of error and the level of confidence in your report.

Submit your completed Assignment Booklet 3B to your teacher for assessment.

